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⑭考案の名称　ブレクリーナ付きエアクリーナ

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㊸参考文献　実開　昭57－18753（ＪＰ，Ｕ）　実公　昭47－10628（ＪＰ，Ｙ１）

1

㉙実用新案登録請求の範囲

サイクロン式除塵部とその下流側の軸流形エレメント内蔵の集塵部とからなるブレクリーナ付エアクリーナにおいて、軸流形エレメントの上流側端に、断面逆Ｌ形の接着部とこれに連結する中空截頭円錐状のエアガイドとを有するエンドプレートを配設し、上記接着部を軸流形エレメントの周端側に固着して成るブレクリーナ付エアクリーナ。

考案の詳細な説明

本考案はエンジンの吸気系に装着するブレクリーナ付きエアクリーナに関する。

エアクリーナ特に多塵地帯で使用される車両のエアクリーナには、フイルタエレメントの掃除または交換時期を延長するため各種のブレクリーナ付きエアクリーナ（以下エアクリーナと略称する）がある。

その従来例として第３図に示すようにエアクリーナ１０があり外筒管１内に除塵部９と集塵部１３を有している。サイクロン式の除塵部９は外筒管１の一方端周壁に設けた吸入口２にルーバ３を配設し、該ルーバ３で吸入エアへ旋回流をあたえ、遠心力で分離した粗粒径ダストは外筒管１の内壁４に沿つて旋回し、内壁４に固設した円筒状パイプ６と円環板７で形成されるエアガイド５の外周を旋回しながらバキュエータバルブ８に集積、排除される。集塵部１３は前記除塵部９の下流側に設けられ、外筒管１内にハニカムエレメント１１が保持部１２で固着されたもので、前記除塵部９で分離されなかつた微粒径のダストはエアガイド５の流入口１５からハニカムエレメント１１側へ吸引され、戸過後清浄な空気のみが接続パイプ１４を経て図示しないエンジンへ吸入されるようになつている。

2

しかしながら上記従来のエアクリーナ１０のエアガイド５は、円筒状パイプ６と円環板７で形成されており、スペースの都合でエアガイド５がハニカムエレメント１１の前端に近接しているときは、流入口１５から進入する微粒径のダストは、エアガイド５の円環板７の幅Ｗで占める円周面積分がハニカムエレメント１１を覆つた状態になり、円環板７とハニカムエレメント１１間の通気抵抗が高くなり、あるいはその分が戸過面積の減少と同じになりダスト捕捉量が減少し、また保持部１２でハニカムエレメント１１のほぼ外周全体を外筒管１に固着しているという欠点を有していた。

したがつて、本考案は、軸流形エレメントの上流側端に、断面逆Ｌ形の接着部とこれに連結する中空截頭円錐状のエアガイドとを有するエンドプレートを配設し、上記接着部を軸流形エレメントの周端側に固着させることを可能にし、戸過面積の減少を阻止したものである。

実施例により説明すると、第１図、第２図において、エアクリーナ２０は除塵部１９を形成する第一外筒管２１と、集塵部２３を形成する第二円

筒管２２を結合したものである。第二円筒管２２に内蔵されるハニカムエレメント１１は軸と同一方向にエアを流通させる、いわゆる軸流形エレメントであつて、従来と同じく例えば帯状戸紙と山部および谷部を有する波形戸紙を重ねて一端側の山部、他端側の谷部に接着剤を補塡しながら巻回して円筒状にし、上、下流側が交互に開端、閉端の袋状通路を形成した公知のものである。そして第２図の要部説明用拡大図に示すように、前記ハニカムエレメント１１の上流側周端にフランジ部１６と断面L形の接着部１７とさらに該接着部１７から上流に向つて断面ハ形の中空截頭円錐状のエアガイド２５を有したエンドプレート１８を例えば接着剤で固着したものである。そしてフランジ部１６を覆う断面がU字形のパツキンと、第二円筒管２２とハニカムエレメント１１間に挟着される円環状のパツキンとを一体的に成形した例えばゴム製の第一パツキン２４がフランジ部１６に被嵌されている。第１図に示した２６は第二円筒管２２とハニカムエレメント１１間に設けた円環状の例えばゴム製の第二パツキンである。さらに第一円筒管２１と第二円筒管２２は前記第一パツキン２４を挟圧するため図示しないハンガーボルトやクリップにより強固にクランプされている。

吸入口２のルーバ３によつて旋回分離された粗粒径のダストは第一円筒管２１内から中空截頭円錐状のエアガイド２５の小径側から大径側へ旋回しながら進行し、パキュエータバルブ８に集積され、エンジン（図示せず）の吸気脈動でバルブVが開閉し外部へ排出される。その場合第一円筒管２１と第二円筒管２２およびハニカムエレメント１１の外周は挟圧された第一パツキン２４によりダスト洩れはない。

また旋回分離されなかつた微粒径のダストは、エアガイド２５の流入口２７よりハニカムエレメント１１に向つて吸入されるが、エンドプレート１８の逆L形接着部１７がハニカムエレメント１１の周端部に接着されることになり、ハニカムエレメント１１のほぼ全面が有効濾過面積となる。なお第２円筒管２２とハニカムエレメント１１の下流側に装着した第二パツキン２６はハニカムエレメント１１の円形を保つとともに耐振作用をなす。

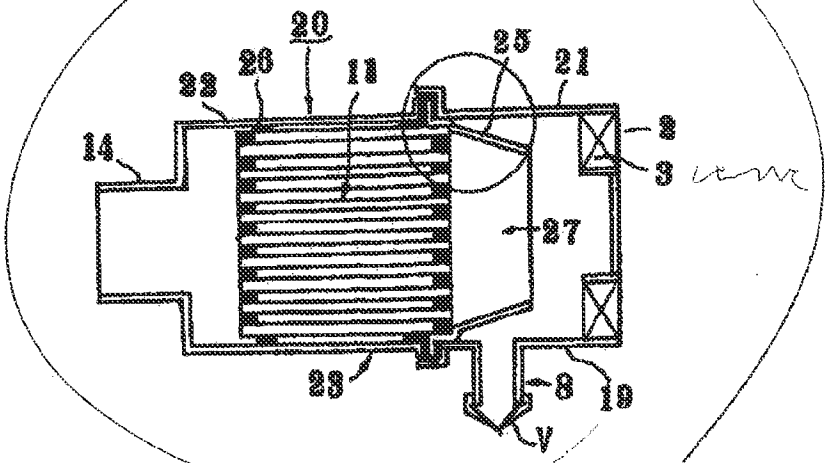
以上のように本考案は、断面逆L形の接着部とこれに連結する中空截頭円錐状のエアガイドを有するエンドプレートを軸流形エレメントの上流端側に配設したので、上記接着部が軸流形エレメントの周端部に固着されることになり、軸流形エレメントの有効面積が増し捕捉ダスト量が増加して軸流形エレメントの寿命を延長させる。

図面の簡単な説明

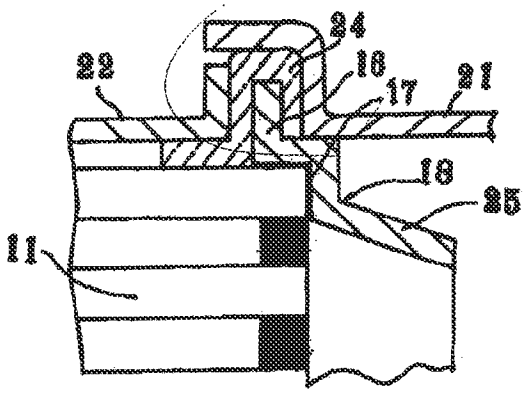
第１図は、本考案の実施例の縦断面図、第２図は第１図の要部拡大図、第３図は従来のものの縦断面図。

５，２５……エアガイド、８，１９……除塵部、１０，２０……プレクリーナ付きエアクリーナ、１１……ハニカムエレメント、１３，２３……集塵部、１８……エンドプレート。

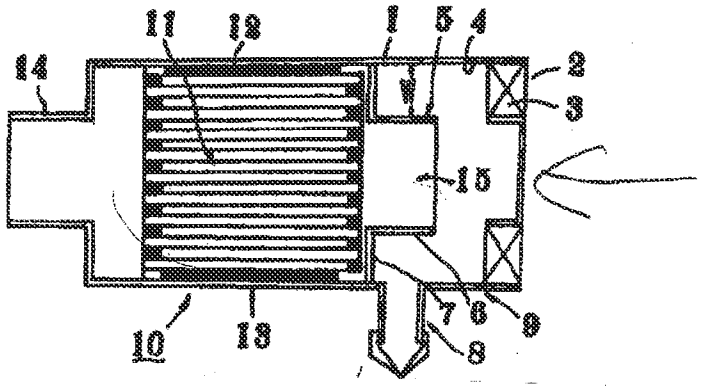
第１図



第2図



第3図



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AIR CLEANER WITH ATTACHED PRECLEANER

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References cited:	Japanese Kokai Utility Model No. Sho 57[1982]-18753 (JP, U) Japanese Utility Model No. Sho 47[1972]-10628 (JP, Y1)

Examiner:	Masahiro Yumita

[There are no amendments to this utility model.]

Claim

A type of air cleaner with attached precleaner characterized by the following facts: the air cleaner with attached precleaner is composed of a cyclone-type dust-removing part and a dust-collecting part, containing an axial flow-type element, downstream from said cyclone-type dust-removing part; in this air cleaner with attached precleaner, on the upstream end of the axial flow-type element, an end plate having a bonding portion with an inverted-L-shaped cross section and having a hollow truncated conical air guide is set; said bonding portion is fixed on the periphery of the end of the axial flow-type element.

Detailed explanation of the device

The present device pertains to a type of air cleaner with attached precleaner installed on the air suction system of an engine.

For air cleaners, especially those of vehicles for use in dusty areas, in order to prolong the interval for cleaning or changing the filter element, various air cleaner with attached precleaners (hereinafter referred to as air cleaners) have been proposed.

In air cleaner (10) shown in Figure 3, there are dust-removing part (9) and dust-collecting part (13) in outer tube (1). For cyclone-type dust-removing part (9), louver (3) is set on suction inlet (2) set on the periphery of one end of outer tube (1). The air sucked with said louver (3) has a circular flow. Coarse grains of dust separated by the centrifugal force are driven to rotate along inner wall (4) of outer tube (1), and, as they rotate on the outer periphery of air guide (5) formed by cylindrical pipe (6) and ring-shaped plate (7) fixed on inner wall (4), they are collected in evacuator valve (8) and are exhausted. Dust-collecting part (13) is set downstream from said dust-removing part (9), and it has honeycomb element (11) fixed inside outer tube (1) by holding part (12). The fine grains of dust not separated in said dust-removing part (9) are sucked from inlet (15) of air guide (5) to the end of honeycomb element (11), and only filtered clean air can go through tangential pipe (14) into the engine (not shown in the figure).

However, said air cleaner (10) of the prior art has the following disadvantage: It is composed of cylindrical pipe (6) and ring-shaped plate (7). In consideration of the space, air guide (5) is set near the front end of honeycomb element (11). In this case, for fine grains of dust that enter inlet (15), the circumference of ring-shaped plate (7) with width W of air guide (5) is covered by honeycomb element (11), the ventilation resistance between ring-shaped plate (7) and honeycomb element (11) increases, and the filtering area decreases proportionately, so that the dust-catching rate decreases. Also, essentially the entire outer periphery of honeycomb element (11) is fixed on outer tube (1) with holding part (12), and this is also undesirable.

On the other hand, according to the present device, on the upstream end of the axial flow-type element, an end plate is set having a bonding portion with an inverted-L-shaped cross

section and having a hollow truncated conical air guide; said bonding portion is fixed on the periphery of the end of the axial flow-type element. Consequently, a decrease in the filtering area can be prevented.

In the following, an explanation will be given regarding an application example. As shown in Figures 1 and 2, air cleaner (20) is composed of first outer pipe (21) that forms dust-removing part (19), and second cylindrical pipe (22) that forms dust-collecting part (23). They are coupled to each other. Air flows along the axis of honeycomb element (11) contained in said second cylindrical pipe (22) to form a so-called axial-flow-type element. Just as in the prior art, for example, ribbon-shaped filter paper and wavy filter paper having crests and troughs are laminated together. While adhesive is applied to the crests of one end and the troughs of the other end, the laminate is wound to form a cylinder so that bag-shaped passages with open ends and closed ends are formed and set alternately on the upstream side and downstream side. Then, as shown in Figure 2, an enlarged diagram illustrating the main portion, on the upstream peripheral end of honeycomb element (11), flange part (16) and bonding part (17) with an L-shaped cross section, as well as end plate (18) having a hollow truncated conical air guide (25) with a ">"-shaped cross section and set from said bonding part (17) towards the upstream side are bonded with an adhesive. Also, first packing (24), which is formed by monolithically molding a packing with a U-shaped cross section and covering flange portion (16) and a packing with a ring shape and held between second cylindrical tube (22) and honeycomb element (11), is fit at flange portion (16). As shown in Figure 1, ring-shaped second packing (26) made of, say, rubber, is set between second cylindrical pipe (22) and honeycomb element (11). In addition, first cylindrical pipe (21) and second cylindrical pipe (22) are clamped forcibly by a hanger bolt and clip, not shown in the figure, such that first packing (24) is held under pressure between them.

The coarse grains of dust cyclonically separated by louver (3) of suction inlet (2) rotate and move between first cylindrical pipe (21) and said hollow truncated conical shaped air guide (25), moving from its smaller-diameter end to its larger-diameter end. As a result, they are collected in evacuator valve (8). Then, with the suction pulse of the engine (not shown in the figure), they are exhausted when valve V is opened/closed. In this case, no leakage of dust occurs because of first packing (24) that is clamped onto the outer periphery of first cylindrical pipe (21), second cylindrical pipe (22) and honeycomb element (11).

On the other hand, the fine grains of dust that were not cyclonically separated are sucked from inlet (27) of air guide (25) towards honeycomb element (11). However, since bonding part (17) with an L-shaped cross section of end plate (18) is bonded to the peripheral end portion of honeycomb element (11), essentially the entire surface of honeycomb element (11) becomes an effective filtering area. Also, second packing (26) set on the downstream side of second

cylindrical pipe (22) and honeycomb element (11) acts to maintain the circular shape of honeycomb element (11) and, at the same time, it plays a vibration-proofing role.

As explained above, according to the present device, on the upstream side of the axial flow-type element, an end plate having a portion that bonds with an inverted L-shaped cross section and having a hollow truncated conical shaped air guide is set; said bonded portion is fixed on the peripheral end of the axial flow-type element. Consequently, the effective area of the axial flow-type element can be increased, the quantity of dust that can be captured increases, and the lifetime of the axial flow-type element increases.

Brief description of the figures

Figure 1 is a longitudinal cross-sectional view of an application example of the present device. Figure 2 is an enlarged view of the main portion of Figure 1. Figure 3 is a longitudinal cross-sectional view of the prior art.

5, 25 Air guide
9, 19 Dust-removing part
10, 20 Air cleaner with attached precleaner
11 Honeycomb element
13, 23 Dust-collecting part
18 End plate

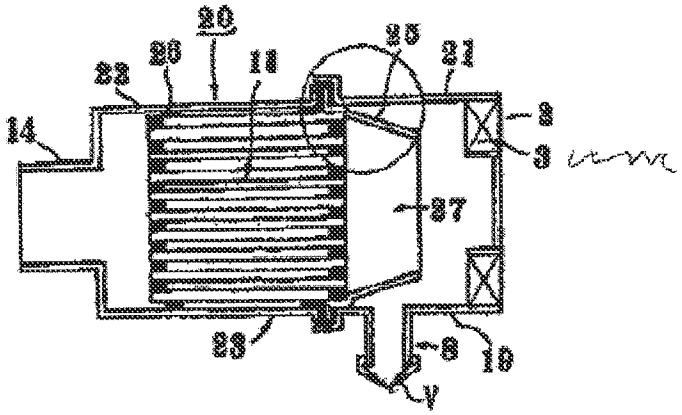

Figure 1

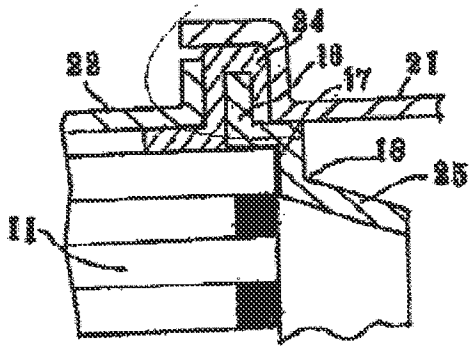

Figure 2

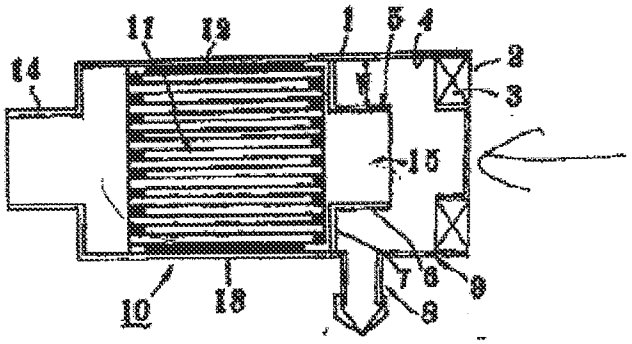

Figure 3

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PRECLEANER-ANNEXED AIR CLEANER

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Tokyo

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Examiner: Masahiro Yumita

[There are no amendments to this utility model.]

Claim

A type of precleaner-annexed air cleaner characterized by the following facts: the precleaner-annexed air cleaner is composed of a cyclone-type dust removing part and a dust collecting part, containing an axial flow-type element, downstream with respect to said cyclone-type dust removing part; in this precleaner-annexed air cleaner, on the upstream end of the axial flow-type element, an end plate having a bonding portion with an inverted L cross-sectional shape and having a hollow truncated conical air guide is set; said bonding portion is fixed on the periphery of the end of the axial flow-type element.

Detailed explanation of the device

The present device pertains to a type of precleaner-annexed air cleaner installed on the air suction system of an engine.

For air cleaners, especially those of vehicles for use in dusty areas, in order to prolong the interval of cleaning or exchange of the filter element, various precleaner-annexed air cleaners (hereinafter to be referred to as air cleaners) have been proposed.

In air cleaner (10) shown in Figure 3, there are dust removing part (9) and dust collecting part (13) in outer tube (1). For cyclone-type dust removing part (9), louver (3) is set on suction inlet (2) set on the periphery of one end of outer tube (1). The air sucked with said louver (3) has a circular flow. Coarse grains of dust separated by the centrifugal force are driven to rotate along inner wall (4) of outer tube (1), and, as they rotate on the outer periphery of air guide (5) formed by cylindrical pipe (6) and ring-shaped plate (7) fixed on inner wall (4), they are collected in evacuator valve (8) and are exhausted. Dust collecting part (13) is set downstream with respect to said dust removing part (9), and it has honeycomb element (11) fixed inside outer tube (1) by holding part (12). The fine grains of dust not separated in said dust removing part (9) are sucked from inlet (15) of air guide (5) to the end of honeycomb element (11), and only filtered clean air can go through tangential pipe (14) into the engine (not shown in the figure).

However, said air cleaner (10) of the prior art has the following disadvantage: It is composed of cylindrical pipe (6) and ring-shaped plate (7). In consideration of the space, air guide (5) is set near the front end of honeycomb element (11). In this case, for fine grains of dust that enter inlet (15), the area of the circumference of ring-shaped plate (7) with width W of air guide (5) is covered by honeycomb element (11), the ventilation resistance between ring-shaped plate (7) and honeycomb element (11) increases high, and the filtering area decreases in this proportion, so that the dust catching rate decreases. Also, essentially the entire outer periphery of honeycomb element (11) is fixed on outer tube (1) with holding part (12), and this is also undesired.

On the other hand, according to the present device, on the upstream end of the axial flow-type element, an end plate having a bonding portion with an inverted L cross-sectional shape and having a hollow truncated conical air guide is set; said bonding portion is fixed on the periphery of the end of the axial flow-type element. Consequently, a decrease in the filtering area can be prevented.

In the following, an explanation will be given regarding an application example. As shown in Figures 1 and 2, air cleaner (20) is composed of first outer pipe (21) that forms dust removing part (19), and second cylindrical pipe (22) that forms dust collecting part (23). They are coupled to each other. Air flows in the direction of the axis in honeycomb element (11) contained in said second cylindrical pipe (22) to form a so-called axial flow type element. Just as in the prior art, for example, ribbon-shaped filter paper and wavy filter paper having crests and troughs are laminated together. While adhesive is applied to the crests of one end and troughs of the other end, the laminate is wound to form a cylinder so that bag-shaped passages with open ends and closed ends set alternately on the upstream side and downstream side are formed. Then, as shown in Figure 2, an enlarged diagram illustrating the main portion, on the upstream peripheral end of honeycomb element (11), flange part (16) and bonding part (17) with an L cross-sectional shape, as well as end plate (18) having a hollow truncated conical air guide (25) with a ">"-like cross-sectional shape and set from said bonding part (17) towards the upstream side are bonded by means of an adhesive. Also, first packing (24), which is formed by monolithically molding a packing with a U cross-sectional shape and covering flange portion (16) and a packing with a ring shape and held between second cylindrical tube (22) and honeycomb element (11), is fit at flange portion (16). As shown in Figure 1, ring-shaped second packing (26) made of, say, rubber, is set between second cylindrical pipe (22) and honeycomb element (11). In addition, first cylindrical pipe (21) and second cylindrical pipe (22) are clamped forcibly by a hanger bolt and clip not shown in the figure such that first packing (24) is held under pressure between them.

The coarse grains of dust cyclonically separated by louver (3) of suction inlet (2) rotate and move between first cylindrical pipe (21) and said hollow truncated conical shaped air guide (25), moving from its smaller-diameter end to its larger-diameter end. As a result, they are collected in evacuator valve (8). Then, with the suction pulse of the engine (not shown in the figure), they are exhausted when valve V is opened/closed. In this case, no leakage of dust occurs because of first packing (24) that is clamped on the outer periphery of first cylindrical pipe (21), second cylindrical pipe (22) and honeycomb element (11).

On the other hand, the fine grains of dust that were not cyclonically separated are sucked from inlet (27) of air guide (25) towards honeycomb element (11). However, since bonding part (17) with an L cross-sectional shape of end plate (18) is bonded to the peripheral end portion of honeycomb element (11), essentially the entire surface of honeycomb element (11) becomes an effective filtering area. Also, second packing (26) set on the downstream side of second cylindrical pipe (22) and honeycomb element (11) acts to maintain the circular shape of honeycomb element (11) and, at the same time, it plays a vibration-proofing role.

As explained above, according to the present device, on the upstream side of the axial flow-type element, an end plate having a bonding portion with an inverted L cross-sectional shape and having a hollow truncated conical shaped air guide is set; said bonding portion is fixed on the peripheral end of the axial flow-type element. Consequently, the effective area of the axial flow-type element can be increased, the quantity of dust that can be captured increases, and the lifetime of the axial flow-type element increases.

Brief description of the figures

Figure 1 is a longitudinal cross-sectional view of an application example of the present device. Figure 2 is an enlarged view of the main portion of Figure 1. Figure 3 is a longitudinal cross-sectional view of the prior art.

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9, 19 Dust removing part

10, 20 Precleaner-annexed air cleaner

11 Honeycomb element

13, 23 Dust collecting part

18 End plate

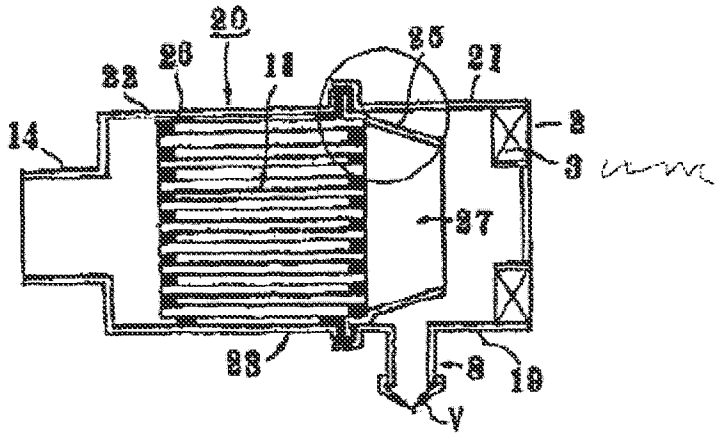

Figure 1

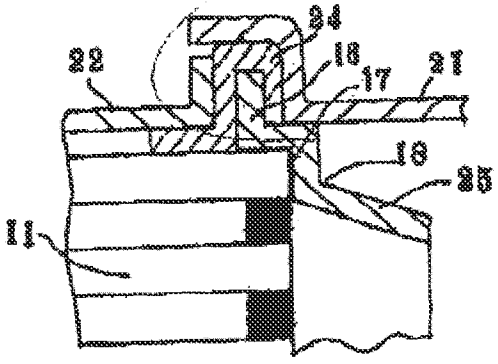

Figure 2

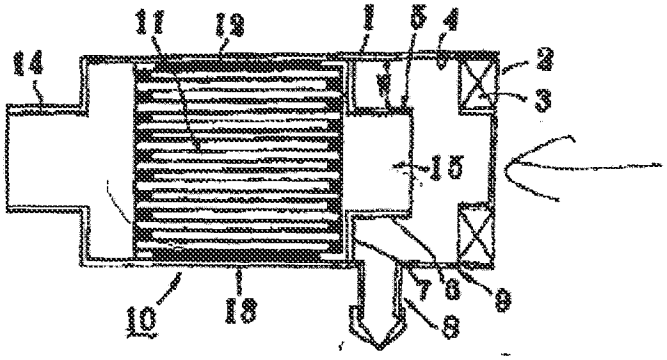

Figure 3